Research Proposal of the Thesis Entitled

International Solar Alliance: Renewable Solar PV Energy effects on Indian Power Economy and Outlook

Submitted for the award of the Degree Of

Doctor of Philosophy

by

Mr. Bhaveshkumar Govindbhai Patel

Under the guidance of

Dr. Sunil Patel
Professor, UWSB

In the

Unitedworld School of Business

KARNAVATI UNIVERSITY

Karnavati University, Gandhinagar

International Solar Alliance: Renewable Solar PV Energy effects on Indian Power Economy and Outlook

Abstract

Energy is described as the ability to make an impact to do work. The energy was an essential factor in fulfilling people's daily needs. The human population is rapidly requiring energy resources for manufacturing, economic, residential, agricultural, and transportation purposes. Various sources of energy are categorized as primary, secondary, private, and non-commercial energy, as well as renewable and non-renewable energy.

Without any geopolitical disputes over natural resources, solar resources are accessible globally. The ability to deliver decentralized power is another benefit of solar energy, which has also few technological risks. In the context of the energy transition, the solar photovoltaic power market has shown significant growth that is supported by stable political support and policy reforms. Due to the economies of scale, cost of the solar energy technology has significantly decreased over the past decade.

Solar parks and commercial large-scale structured solar projects are helping solar power deployment gain momentum globally, and so cross-border interconnectivity is becoming more significant. Resolution A/RES/36/193 of the UN General Assembly in 1981 demonstrated the need for collaboration between developing nations and the mobilization of financial capital for modern and sustainable energy sources. After 2002 a range of lobbying groups, mostly to disseminate awareness of green energies, were set up after the UN Summit on Sustainable Development.

The ISA has focused its efforts in this area as the leading international organization for solar energy and is currently creating a long-term strategy, operational plans, a road map, and an institutional structure to move this initiative forward gradually. The ISA believes that the

solarisation of the final mile will have the biggest revolutionary influence on welfare and socioeconomic progress. The programs offered by ISA in a variety of fields, including affordable global financing, agriculture, residential commercial, and industrial rooftop solar systems, KW to MW scale grids, power storage, and solar parks, are all created to encourage the expansion of solar power throughout all of its member nations in a variety of ways. Additionally, the numerous capacity-building projects of ISA would guarantee the availability of trained labor for every aspect of the implementation and deployment of solar power.

The ISA is working to realize this vision by encouraging the adoption of solar-friendly roadmaps, policies, laws, exchanging best practices, fostering global agreement on standard practices, and organizing capital. The strengths and capacities of various global players, including financial institutions, the Public sector, bilateral and multilateral institutions, corporate, industry, and other stakeholders are being synergized in the spirit of multilateral cooperation. ISA is keen to coordinate and aggregate with member countries' demands like managing capital for solar projects, technologies, and development in order to make solar energy economically viable.

The majority of studies conducted in recent years have aimed to address issues that are quite particular, such as the financing and the expansion of solar energy technology and its effects on renewable electricity infrastructure. The main aim of this work is to contribute in the creation of information access for Innovative Solar Energy Technology services, systems, and concrete policy throughout ISA. This work will act as a voice for raising common economical prospects, environmental prospects, socio-cultural political prospects, technological prospects, and employment issues for the development and deployment of Solar Energy Technology in the enhancement of Energy Security of India on an international platform.

Keywords: ISA, International, Solar, Energy, Renewable, Alliance, Technology.

Problem Definition

A significant utility element of socioeconomic progress is energy. Today's 21st-century modern society can only develop and be nurtured with sustainable 24 X 7 electricity at a low cost. Government should concentrate strongly on the issue of energy policy in order to accomplish this socioeconomic goal of a stable and sustainable energy supply.

Since the mid-2000s, the development of solar photovoltaic power technology PV sector went through a period of rapid change driven by public policies to support the PV applications. Solar PV energy is regarded as one of the primary mitigating technologies of decentralized energy supply because of the significant drop in the cost of PV modules and solar technology over the past ten years.

The majority of recent studies directed to address difficulties pertaining to highly specific topics, such as the financing ecosystem for the advancement of solar energy technology and its implications on renewable electricity systems. This work started from this thought, what takes place in the Solar Energy Technology development, and what will be the next for solar energy policy mechanisms in India and ISA member countries?

So, policymakers require a more extensive point of view to decide on strategic directions for the advancement of solar energy technology for the future energy power policy. In this context, this proposal aims to analyze the ISA forum – Operational Mechanism, with a focus on the connections between the numerous sector that determine the Solar Energy Technology system and its implementation within the member countries.

Notably, it will work as hoisting frequent economical concerns regarding the development and deployment of Solar Energy Technology on at a global platform. There are likely to be

increasing opportunities for Solar Energy Technology throughout the Indian economy by detailed micro and macro study of ISA opportunities. These opportunities will need to be supported by a strong commitment politically within India and its member countries, both at the central government and state government levels to transition more sustainable growth path.

It will also indicate how the universal use of solar energy technology in ISA member countries may lower costs, save money on foreign exchange, and enhance the energy infrastructure without requiring excessive investment. Additionally, it will support the flow of research to industry and contribute to enhanced employment development.

ISA policy will play an instrumental and understanding role, for whom presently not having the technical resources to access this potential source of energy and turn it into a chance to develop rural areas. Global marketing action in these areas of transforming Solar Energy Technology to ISA developing countries will help to build momentum for change as each country learns from the experience of other countries how it is possible to grow and overcome energy poverty and energy need with the green revolution, for preserving the environment both locally and also globally.

This needs to be supported by public awareness and mobilization of opinion in favor of policy implementation and transformation, which deal effectively with the social cost of pollution arising from the burning of fossil fuels.

Research Questions

The objectives of this study are as below:

1) To Study the Recent Policy Initiative of the ISA FORUM for the adoption and diffusion of Solar Energy Technology.

2) To Indicate Pre and Post effect of ISA FORUM on INDIAN ENERGY ECONOMY. (Macroscopic and Microscopic perspective of Solar Energy Technology system through ISA Forum).

3) To identify deployment process of Solar Energy Technology in enhancement of Energy Security of India.

Research Methodology

Methodology

For first objective,

The framework of the research work will consist of the informational theory part that is followed by a description of the empirical part. Techniques such as existing theory from the field of Solar Energy Technology through Secondary data will be collected and analyzed.

For second objective,

In order to evaluate the solar energy implementation on macro and micro level econometric models has been done. Using time-series data / primary structured questionnaire model from India and ISA member countries for the period of last 10 years a probabilistic hypothesis model will be developed.

For third objective,

Hypothesis analysis will be developed base on Semi Structured interview and structured questionnaire model with the solar industry market players, policy makers, consultants, government officials and stakeholders.

Data Analysis techniques

Secondary data will be collected through reports and government official documents to define characteristic of study and factors involved for further primary study.

Primary data related will be collected from structured questionnaire and personal interview.

Global Value Chains (specific for ISA member countries) firm strategies will analyses value chains upon the division of implementation of ISA work in India and in member countries.

Tentative Chapter Plan

Chapter I – Introduction

This chapter depicts the overview of the study, introduction, rationale of the study, and it explain about ISA and Indian power and economy outlook. This also discusses the objectives of the study and the problem statement.

Chapter II – Review of Literature

This chapter provides a thorough literature review and explores the insights of previous studies on ISA and it related factors.

Chapter III- Research Methodology

This chapter describes the Methods and procedures like construction of questionnaire, data collection, sampling technique and statistical tools used for analysis in successful completion of the research work and limitation of the study.

Chapter IV – Data Analysis and Interpretation

This section includes the data analysis, which will be presented in three major parts namely, Part I – Descriptive Analysis, Part II – Differential Analysis, and Part III- Hypothesis Testing.

Chapter V – Summary of Findings and Conclusion

This chapter comprises the summary of findings, conclusion, suggestions for implementation, and scope for further research.

Visible Research Outputs

Outputs

Notably, it will act as a voice for raising common economical prospects, environmental prospects, socio-culture political prospects, technological prospects, and employment issues for the development and deployment of Solar Energy Technology in the enhancement of Energy Security of India at an international platform.

There are likely to be increasing opportunities for Solar Energy Technology throughout the Indian economy through detailed micro and macro study of ISA opportunities.

It will be beneficial to a wide range of stakeholders, including policymakers in the relevant ministries, producers, and users, as well as those who want to discover a new techno-commercial aspect of how Solar Energy Technology can be transformed into inclusive innovation throughout ISA member countries.

There will be a number of tangible results from the project that will work as benchmarks for the project activities like,

1. Working papers

2. Ph.D. thesis

3. Workshop

4. Policy briefs

Future Plans

The long-term objective of this initiative is to contribute to the creation of information access for Innovative Solar Energy Technology services, systems, and concrete policy throughout ISA.

Goal

The goal of this work is to examine how outcomes of energy production system form international solar alliance co operation on Solar Energy Technology can be shaped and transformed.

References

1. Idfc (2010), discussion paper , Barriers to development of renewable energy in India & proposed recommendations
2. Vishwas-Chakranarayan(2011), Adoption and diffusion of new and renewable energy technology products for domestic use
3. Marcio Aredes, Joseph Monte and Isis Spinola-Schwartz (2011),energy production – sustainable solution to urban waste/ reuse in developing countries
4. Rasmus Lema, Aalborg University, Denmark(2014), Innovation and Renewable Electrification in Kenya
5. Working Paper No. 53 on International Solar Alliance (2016), International Solar Alliance -Nurturing Possibilities ,Export – Import Bank of India
6. A Renewable Energy Promotion Policyfor Achieving a Low-carbon Society(2009)
7. Committee on Renewable Energy Promotion Policy for Achieving a Low-carbon Society ,Ministry of the Environment Government of Japan(2009)
8. APEC Peer ,Renewable Energy Promotion Policies(2012), Review on Low-Carbon Energy Policies (PRLCE) Phase-1
9. Renata Dombrovski (2011),Efficient energy tax policies for promoting emergent technologies
10. MontekAhluwalia ,Himanshu Gupta ,Nicholas Stern Working Paper 328(2016),A More Sustainable Energy Strategy for India
11. fredric beck, (2004)renewable energy policies and barriers,Encyclopaediaof energy, volume5
12. Farhad D. Rad , (2011)On Sustainability in Local Energy Planning ,lund university
13. Evaluating Renewable Energy Policy : A Review of Criteria and Indicators for Assessment (2014), International Renewable Energy Agency IRENA

14. GOVERNMENT OF INDIA MINISTRY OF NEW AND RENEWABLE ENERGY (2016),Declaration on the occasion to launch the International Solar Alliance of countries dedicated to the promotion of solar energy ,LOK SABHA STARRED QUESTION NO. 26
15. Directorate general for internal policy, policy department economic and scientific policy (2016),Implementing the paris agreement issues at stake in view of the cop 22 climate change conference in Marrakesh.
16. Can Wan, Jian, Yonghua (2015)Photovoltaic and Solar Power Forecasting for Smart Grid Energy Management ,CSEE JOURNAL OF POWER AND ENERGY SYSTEMS", VOL. 1, NO. 4,
17. Bapat Om ,Bapat Vishram(2016), " An Overview of Solar Energy Policy of India and Few Prominent Nations in the World", ICPEICES-1st IEEE International Conference on Power Electronics. Intelligent Control and Energy Systems
18. Hyun Jin Julie Yu. (2016) Public policies for the development of solar photovoltaic energy and the impacts on dynamics of technology systems and markets. Economies and finances. PSL Research University, English. [NNT : 2016PSLED011].
19. Working Paper on International Solar Alliance (ISA)(2016)
20. Ashok Gulati, StutiManchanda ,RakeshKacker Working Paper 329(2016),Harvesting Solar Power in India!
21. Isa website (macro objective – operation and management task force)
22. Compendium of Global Success Stories in SOLAR ENERGY (2019)
23. International Energy Agency (IEA), CO2 Emission from Fuel Combustion, (2015).
24. International Energy Agency (IEA), Report IEA-PVPS: Trends in Photovoltaic Applications, (2018).

25. M. Goel, Solar rooftop in India: policies, challenges and outlook, Green Energy & Environment 1 (2) (2016).
26. Outlook on the Indian scenario of solar energy strategies: Policies and challenges, (2019) https://doi.org/10.1016/j.esr.2019.04.005 ;
27. R.P. Lal, Role of renewable resources in Indian energy sector, Glob. J. Res. Anal. 7 (2) (2018).
28. United Nations Framework Convention on Climate Change https://unfcc.int/news/ international-solar-alliance-enters-into-force.(Accessed on Dec.-2019)
29. A. Gulagi, P. Choudhary, D. Bogdanov, C. Breyer, Electricity system based on 100% renewable energy for India and SAARC, PLoS One 12 (7) (2017) e0180611.
30. N.U. Kamble, S.D. Patil, Techno-Economic Analysis of Solar Pv System, (2018).:
31. F. Beck, E. Martinot, Renewable energy policies and barriers, Encyclopedia of energy 5 (7) (2004) 365–383.

Signature of Student **Signature of Supervisor and Co-Supervisor(s)**